Date: Mon, 31 Oct 94 04:30:28 PST
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>
Errors-To: Ham-Homebrew-Errors@UCSD.Edu
Reply-To: Ham-Homebrew@UCSD.Edu
Precedence: List
Subject: Ham-Homebrew Digest V94 #321
To: Ham-Homebrew

Ham-Homebrew Digest Mon, 31 Oct 94 Volume 94 : Issue 321

Today's Topics:

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

Date: Sun, 30 Oct 1994 11:12:22 GMT
From: garry@goldhill.demon.co.uk (Garry)
Subject: CMOS Super Keyer 2

The local radio club are interested in making a few of the cw keyers as shown in the ARRL Handbook (page 29.8). The keyer features a cpu with onboard ROM. No problem to program such a beast, if we had the program. Can some kind person Email (UUencode) the binary or better still, the source. I am of course assuming it is PD.

--
Garry
G4FRO @ GB7IMB.#41.GBR.EU
garry@goldhill.demon.co.uk

Date: 31 Oct 1994 02:56:08 GMT
From: lascal@cortez.its.rpi.edu (Lance Lascari WS2B)
Subject: HELP: Duroid anybody have rogers' number?

Hello,
     I remember some time ago, there was a discussion about PCB materials useful at microwave frequencies. I'm working on a senior design project, and looking to find some DUROID type material. (for some components of a 2304/3456 MHz amateur transverter design).

     I got the university support number from rogers from somebody a while back, but lost it. Could anybody help me out?

          thanks so much,
               -Lance Lascari WS2B

p.s. anybody have a cheap source of rogers 5880 (0.031") material? (:))

--
Lance Lascari WS2B <lascal@rpi.edu> Senior EE @ Rensselaer Polytechnic Inst.
Mount Greylock Expeditionairy Farce Secret agent #52,342

Date: Sat, 29 Oct 1994 22:59:44
From: fdugas@halcyon.com (Fred dugas)
Subject: Millen Grid Dip Meter

Howdy Everyone, I just found a Millen Grid Dip meter and as usual It did'nt have the paperwork. If anyone knows where or how I can get the docs. please e-mail me at "fdugas@halcyon.com" thanks for reading this message.
Fred
fdugas@halcyon.com
n7sxk@n7oqn.wwa.usa
hphu32a@prodigy.com
fdugas@attmail.com
Everett,WA. 98203

Date: Sun, 30 Oct 1994 21:03:03 GMT
From: drp@netcom.com (Randy Petersen)
Subject: Need Variactor Diodes for Doubler

I am looking for some variactor diodes which can be used in a frequency doubler or trippler circuit. They have been very hard to find as of late and I am and a group of other HAMS need some to make a doubler or trippler to generate a signal on the 2.4 gig HAM band. We might use a 1.2 gig HT into a doubler to get to 2.4 or use an 800 meg commercial radio into a trippler to get 2.4 gig. We have good luck with the few we have been able to find surplus. Any help you might give us to find more would be very much appreciated.

Thanks
Randy Petersen
KE6IZZ
drp@netcom.com
73s

Date: Fri, 28 Oct 1994 20:46:03 GMT
From: ravengre@adcae1.comm.mot.com (Gregory Raven Redi)
Subject: Requesting tunnel diodes

The P-channel/N-channel JFET configuration was called a "lambda diode" due to the shape of the negative resistance curve looking like the greek letter lambda. There was also an article in 73 magazine in the 70s I believe. I built one and got it to oscillate to at least 30 MHz. That was several years ago. Negative resistance devices have kind of fallen out of favor due to the proliferation of high-frequency three terminal devices.

Regards,
Greg Raven
KF5N
egr002@email.mot.com

Date: 29 Oct 1994 02:35:49 GMT
From: Jeff Duntemann <jeffd@coriolis.com>
Subject: Siliconix DV28120V wanted

> I am looking for a DV28120V FET which should be produced by
> Siliconix, but the local Siliconix dealers don't now this transistor. It is a dual VHF
> power FET which is capable of about 120W HF output.

Siliconix is now owned by Temic, a German company in the Daimler-Benz group. I have the

1994 Temic catalog, and that part is not present. Since you're in Germany, you might contact
a Temic office locally and see if they have a special high-power RF devices catalog. Or
perhaps the part is too new (or even unreleased) and not in the standard '94 catalog.

Wish I had better news. I've been looking for a good cheap high-power RF MOSFET myself.
Motorola is the only game in town, and they're not cheap. You can use the IRF type FETs
(which are designed for switching applications) up to 20M or so with good efficiency. They
hardly work at all on 6M, which is what I want to design for.

--73--

--Jeff Duntemann KG7JF

Date: Thu, 27 Oct 1994 09:52:38 +0000
From: ip@g8sjp.demon.co.uk (Iain Philipps)
Subject: Source of chip?

Folks,

I've just exhausted all the opportunities (known to me) for finding the following Motorola IC:-

        MC145436P

which is (probably) a hybrid DTMF decoder with audio filter, time base and TTL-level output.

Any suggestions of outlets (either US or UK) which carry this part would be most appreciated.

--
Iain Philipps

Date: Sun, 30 Oct 1994 02:27:21 GMT
From: rohrwerk@orac.holonet.net (John Seboldt)
Subject: Tek 1L5 crystal?

I just got the Tektronix 1L5 scope plug-in, which is the 50 Hz to 1 MHz spectrum analyzer, at a hamfest. On plugging it into my 533A scope, I got a trace, and it adjusts with the vertical centering control, but nothing like spectrum analyzer behavior! On closer inspection, a crystal is missing from the socket on the left side of the unit.

Can anyone help with a manual for this thing, and/or tips on how it's supposed to work, and/or a crystal or at least the right frequency? Does Tek still support this old stuff?

John Seboldt K0JD
Minneapolis, MN

Date: 30 Oct 1994 14:18:59 -0800
From: burt@teleport.com (Burt Keeble)
Subject: THE LITTLE RAZOR BLADE RADIO (UPDATE)

In article <1994Oct30.045752.13121@ke4zv.atl.ga.us*,
Gary Coffman <gary@ke4zv.atl.ga.us* wrote:
*In article <38rro9$p6e@elaine.teleport.com*burt@teleport.com (Burt Keeble)
writes:
**
** I have determined that any piece of carbon steel will serve as
** a collector. Ordinary ferrous materials will not. The
** literature says that regular razor blades work better than blue
** blades.
*
*The reason high carbon steel is needed is that it's the ferric carbides
*that act as the semiconductor. These are distributed in domains in the
*steel, so you have to hunt for a sensitive spot with your cat's whisker
*to get best response.
*

So far, the only sources of high carbon steel that I have found are cutting implements (razor blades, carving blades, etc....). I would like a source that isn't potentially dangerous.

Any suggestions?

-burt

--

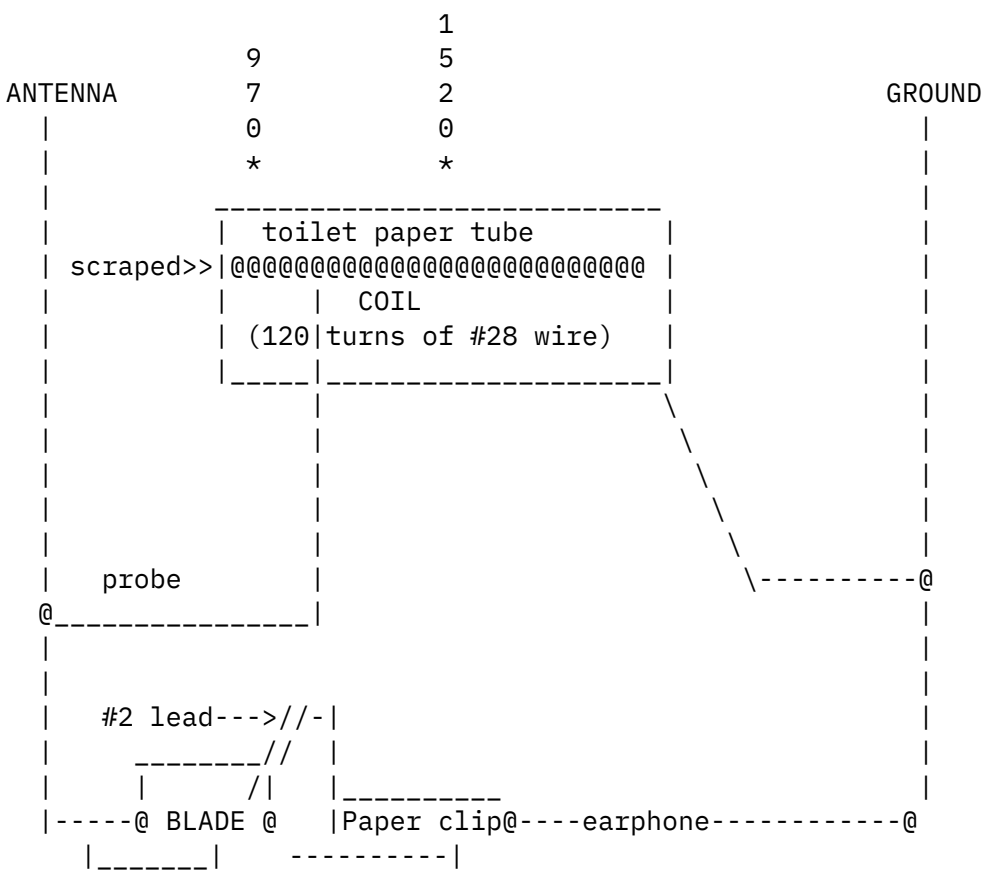
"We are all descended from a long line of determined, resourceful,
 microscopic tadpoles--champions every one." K.V.

Date: 28 Oct 1994 14:51:05 -0700
From: burt@teleport.com (Burt Keeble)
Subject: THE LITTLE RAZOR BLADE RADIO (UPDATE)

Hi,
 First, I tried Bob Keys' idea of an aluminium foil capacitor, and
 the result was counter productive. Maybe i did it wrong?

 Then,

 I tried Gary Coffman's suggestion of scraping insulation of the coil
 and using a slider contact. Well, i used a wire probe instead. Got
 some good results. Two stations now: Alternative Rock (strong), and
 Sports (weak). But hey, it's growing.
 Here is the updated schematic:



The paper clip provides a spring-loaded holder for the
pencil lead.   Sand the part of the paper clip where the
lead is attached. This provides some holding ability for the

holder. Lay the lead against the clip and secure the two
parts by wraping them with fine wire, or thread.
You can also use "invisible" tape. Make sure you have a good
firm anchorage for the lead.

The lead should have a good point where it makes contact with
the razorblade. The paper clip does *not* make contact with the
blade.

I have determined that any piece of carbon steel will serve as
a collector. Ordinary ferrous materials will not. The
literature says that regular razor blades work better than blue
blades.

Use a braided wire probe. For some reason, it picks up much
better than a single point.

Scrape the insulation on the coil to reveal a shiny band of bare
copper (@@@@@) running the length of the coil.
Touch the probe to various spots on the band. Keep your hand
steady!

So far, I've been able to pick up 970KH (strong), and 1520 KH
(weak). Who knows what treasures lie ahead. :)
--

"We are all descended from a long line of determined, resourceful,
 microscopic tadpoles--champions every one." K.V.

Date: Sat, 29 Oct 1994 13:32:04 GMT
From: gary@ke4zv.atl.ga.us (Gary Coffman)

References<9409247830.AA783016585@mails.imed.com>
<1994Oct25.153307.2220@ke4zv.atl.ga.us>, <38k6jp$7cr@crl5.crl.com>
Reply-To: gary@ke4zv.atl.ga.us (Gary Coffman)
Subject: Re: Where does the power go?

In article <38k6jp$7cr@crl5.crl.com> dmiller@crl.com (Donald J. Miller) writes:
>Gary Coffman (gary@ke4zv.atl.ga.us) wrote:
>
>: You've fallen into a common error, Ray. An active transmitter is not a
>: dissipative load, 50 ohms or otherwise. There's no resistor inside its
>: output port waiting to absorb the pulse. As I covered in another post,
>: the pulse will be effectively totally reflected from the working transmitter,
>: neglecting circuit losses. The output impedance of a working transmitter
>: is simply the *loadline* (E/I) of the output stage, transformed in impedance

>: by the output network to appear to be 50 ohms at the output connector. In no
>: way is it actually a physical resistance. All of the RF energy eventually
>: is absorbed by the actual load, perhaps after many reflections if the
>: mismatch is great, just like circulating currents in a tank circuit, or
>: dissipated in circuit and cable losses. It is *not* dissipated in the
>: *output* impedance of the transmitter. An output impedance is not equal
>: to an input resistance looking back into a working transmitter's output
>: port. Remember, power can only be dissipated in a real resistance.
>
>Wrong.
>
>The output of a transmitter is nothing more than the output of an RF
>amplifier. I have measured the output impedance of many an rf amplifier
>by connecting the output to a vector network analyzer and doing a one-port
>measurement.

Sure, a transmitter is nothing more than a large signal amplifier,
and oscillator, modulator, etc but we can ignore the latter items
for our current purposes. The key item is that the amplifier be
working and outputting power. Measurements looking back into a
device not outputting power aren't of interest for this discussion.

>How does a network analyzer work? It sends an RF signal to the device
>under test and measures what gets reflected back. The ratio of the
>reflected signal to the "sent" signal is the reflection coefficient.
>(Reflection coeficient and impedance are related by the smith chart
>transform) A reflection coefficent of 0 (no reflection) is a perfect
>match. If there is no reflection, the power *is* being disappated
>somewhere!

Not necessarily, or at least in a somewhat unexpected place. Let
me work up to this somewhat slowly so that we all are singing from
the same book. We can model a large signal amplifier in several
ways. I'm going to model it as a voltage source and internal impedance
to start. I'm also assuming that the impedances are all "real", IE they
have no reactive component. We'll call this figure 1.

For ease of illustration, I'm going to assign Z1 and Z2 to be 1 ohm
each, and set V equal to 2 volts. This is a "matched" situation with
1 ampere of current flowing, and 1 watt of power being dissipated in

each of Z1 and Z2. If we change Z2 to 0.5 ohm, then we have 1 1/3 amperes of current flowing in the loop, Z1 has a voltage drop of 1 1/3 volts, and Z2 has a voltage drop of 2/3 volt. That gives a power dissipation at the load of 8/9 watt, and in the source of 1 7/9 watts. If instead we make Z2 equal 2 ohms, then we have a loop current of 2/3 amp, and voltage drops at Z1 of 2/3 volt and at Z2 of 1 1/3 volt. That gives a power dissipation at the source of 8/9 watt and at the load of 1 1/3 watts.

To sum up, for the matched case we have an efficiency of 50%. In the case of the 0.5 ohm load the efficiency is 32%. And in the case of the 2 ohm load the efficiency is 60%. So it appears that our amplifier efficiency improves when the internal impedance is smaller than the load impedance, *not* identical as in the matched case. This has real implications for us because we know that large signal RF amplifiers with efficiencies greater than 50% exist, and are in common use every day at transmitter sites all over the world. We can safely conclude that these transmitters do not have matched real impedances in source and load.

Ok, what about reflections? In the case above I'm implicitly assuming that the "line" to the load is chosen to be the same impedance as the load in each case to prevent a mismatch. I could have alternately assumed the line was infinitely short so that the waves would have no place to stand. :-)

But now lets consider that the line impedance is a nominal 1 ohm so that we'll have a reflection if the load is not 1 ohm also. Note we'll assume the line is lossless, IE the impedance is imaginary or purely reactive. In the matched case there is no difference. But in each of the other cases there is a 2:1 mismatch at the load.

In both cases, a current pulse will flow back down the line toward the generator. If we assume the forward current has a positive sign, this reflected current pulse will have a negative sign. When this current pulse reaches Z1, it will appear as a discharged reactance at point x. This will cause a correspondingly larger current to flow through the impedance from the source to cancel it. That larger current will cause a larger voltage drop across Z1, and cause a larger power dissipation in Z1. This is what we would expect. Note the extra power being dissipated in Z1 is *from the power supply*, not from the reflection.

Now that assumes that Z1 is a real impedance. If Z1 is a reactive impedance, the situation changes. Depending on whether the load mismatch is greater than the line impedance or less than the line impedance, the source will see either a capacitance or an inductance. Now if the output network of the source is also reactive, this

reflected reactance will be absorbed by the network. If the network is tuned to resonance under these conditions, the reactance, and the current pulse it stores, are absorbed into the circulating currents of the output tank, and are coupled back out toward the load in sum with the next output pulse. This is called conjugate matching, and no reflected power is dissipated by the amplifier. There will be, of course, circuit losses due to the finite Q of the output network, and there will be losses in the line due to it not being a pure reactance in real circuits. However, this is not the same as the reflection being absorbed into a dissipative "output impedance" of the amplifier.

Let's talk a moment about what we mean by "output impedance". We'll use a vacuum tube for this discussion, though a transistor would serve as well excepting it has to be viewed as a current operated device which alters some of the details, but none of the fundamental principles.

The output impedance of a tube is it's *load line*, IE the dynamic E/I plot at it's output terminal. It is not a resistor, though it satisfies the Ohm's Law equation for how E and I would behave if a real resistor were present. The British call tubes *valves*, and that's an apt name for how a tube works. A valve regulates the flow of water from a high pressure point to a low pressure point. It doesn't *dissipate* any water. If you attempt to backfeed a pulse of water through a valve, you merely reduce the flow from the reservoir for a moment, IE you shift the P/V load line of the valve. That can *look like* a resistance, but you don't dissipate any water. All the real effects are on the flow from the reservoir. The same holds true with a tube. The real part of a tube's impedance is tiny, just contact resistance. It's nowhere near 50 ohms with any well designed socket. The imaginary part of a tube's impedance is mainly capacitive, but that can't dissipate power because reactances can't do that, only real resistances can. Electrical pulses backfeeding into a tube's output network simply cause momentarily greater or lesser surges of current to be drawn from the *power supply*. They don't "dissipate" in the tube "output impedance". A tube's output impedance is merely the optimum load that should be applied to the tube at a given plate voltage and bias setting. It's not at all the same thing as the source impedance shown in figure 1. As the examples show, we want that to be as low as possible. That's why power tubes have large contact surfaces, often silver plated.

Gary
--
Gary Coffman KE4ZV | You make it, | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | we break it. | emory!kd4nc!ke4zv!gary

534 Shannon Way | Guaranteed! | gary@ke4zv.atl.ga.us
Lawrenceville, GA 30244 | |

Date: 28 Oct 1994 20:31:10 GMT
From: browere@einstein.cs.ucdavis.edu (Eric B.)

References<G.Moretti-271094093000@130.123.96.67> <kludgeCyC3JH.M90@netcom.com>,
<38p0qj$ip6@elaine.teleport.com>
Subject: Re: The Little Razor Blade Radio

Burt Keeble (burt@teleport.com) wrote:

: I would very much enjoy it if you created that thread. This
: something-out-of-nothing stuff is very entertaining!

: -burt

I agree 100% !!! This is definately a thread worth perpetuating! Such
'homebrews' and investigations can be excellent methods of learning
for relative beginners, like myself.

Eric
(Sorry for the reply mail, Burt- my finger slipped.)

Date: Mon, 31 Oct 1994 00:12:25 GMT
From: gary@ke4zv.atl.ga.us (Gary Coffman)

References<38rro9$p6e@elaine.teleport.com*
<1994Oct30.045752.13121@ke4zv.atl.ga.us>, <39164j$ohr@elaine.teleport.com>
Reply-To: gary@ke4zv.atl.ga.us (Gary Coffman)
Subject: Re: THE LITTLE RAZOR BLADE RADIO (UPDATE)

In article <39164j$ohr@elaine.teleport.com> burt@teleport.com (Burt Keeble)
writes:
>So far, the only sources of high carbon steel that I have found are
>cutting implements (razor blades, carving blades, etc....). I would
>like a source that isn't potentially dangerous.
>
>Any suggestions?

Chain saw bars, cold chisels, files, etc are all high carbon steel.

Gary

--

Gary Coffman KE4ZV | You make it, | gatech!wa4mei!ke4zv!gary
Destructive Testing Systems | we break it. | emory!kd4nc!ke4zv!gary
534 Shannon Way | Guaranteed! | gary@ke4zv.atl.ga.us
Lawrenceville, GA 30244 | |

End of Ham-Homebrew Digest V94 #321
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